सत्यमेव जयते

IRRIGATION WATER

AND

THE COMMUNITY

THE PUBLICATIONS DIVISION

43/2
CD94/2
701

IRRIGATION WATER AND THE COMMUNITY

CD94/2
G89/2
701
631-GOI
CD 106 (a)
21.1, 13.6, 16
1688
631 GOI

सत्यमेव जयते

Issued on behalf of

MINISTRY OF COMMUNITY DEVELOPMENT
GOVERNMENT OF INDIA

February 1957

CONTENTS

Chapter		*Page*
1.	Introduction	3
2.	Private Irrigation	4
3.	Co-operative Irrigation	6
4.	Maintenance and Management of Irrigation Works by the Community	9
5.	Irrigation Extension	11
6.	Reaching the Irrigation Technique to the Community	14
7.	Irrigation Benefits and the Community	16

1. Introduction

When we think of "Irrigation", we rarely associate the community with it because almost all the major irrigation enterprises are State-owned and State-managed. In these works the community comes into the picture only after irrigation water is delivered into the field. However, the community has manifold duties to perform if it is really interested in getting the best use of water.

On the other hand minor irrigation works are both State-owned and also owned by the people. In fact, the present trends are to transfer the management of all minor irrigation sources, owned by the State, to the cultivators themselves. The cultivators may be represented by a Panchayat, a Vikas Mandal, a co-operative body or even irrigation associations consisting of groups of irrigators. In the minor irrigation works which are already owned by the irrigators and run and managed by them, their responsibility to the nation in augmenting food production is very great indeed. Here the community is not only responsible for the best utilisation of conserved water but has also to see that the irrigation works are maintained and kept in a good working order. In the following paragraphs an attempt has been made to indicate the various duties and responsibilities of the community in the conservation and use of irrigation water and the important role they are required to play to stimulate a general water-consciousness among the cultivators for the benefit of the common man.

2. Private Irrigation

Approximately 50 per cent of the irrigated area in the country receives its water from private canals, tanks and wells. These are necessarily minor irrigation works. The importance which minor irrigation has received during the past few years is too well known to be mentioned. Among its several advantageous features one is the linking of the community with collection and conservation of irrigation water.

Private irrigation is sometimes crude and unscientific, but once the community itself becomes its author and patron, its value is greatly enhanced in the eyes of the cultivator. It has been the aim of minor irrigation programmes in Community Projects to stimulate private irrigation as distinct from state irrigation. In private irrigation the cultivator realizes the real value of water. In state works it is not uncommon to find him hostile to irrigation water because he has to pay for it to Government. He looks upon a state irrigation work simply as a welfare work and believes, rightly or wrongly, that Government are duty bound to give him plentiful supplies of water free or at a nominal cost. He often fails to appreciate the full value of water which the government collects and conserves at an enormous cost.

When, however, an irrigation source is owned privately, water suddenly becomes precious to him. He makes every effort to use the water in the best possible manner, which he has collected after a good deal of labour and often with a lot of capital investment. The tubewells in northern India offer a striking example of this psychology of the cultivator. The cost of water from a tubewell in the Punjab is appreciably less than water drawn from an

open well through pumps or Persian Wheels. While no Persian wheel or pump would be found to be idle, the cultivator has not yet been attracted to the tubewell water because the rates are much higher than the canal water rate. The fact that tubewells are owned by the State and wells by the community makes the difference. Community ownership of irrigation works, therefore, would go a long way in ensuring full utilisation of water.

As the programme of Community Projects and National Extension Service moves forward, more and more community irrigation works are springing up. In some parts of the country one could see irrigation tanks being constructed on community basis. Such tanks have been built in Rajasthan and Madhya Bharat. In others community is the owner of tanks. The community builds, maintains and utilises the tanks for irrigation. Pioneer work in this direction has been done in the former State of Kutch. In the States of Uttar Pradesh and the Punjab there are private tubewells. The tubewell owners not only irrigate their own land but also sell water to their less well-to-do neighbours who cannot afford these installations. Construction, maintenance and operation of *Kuhls**, dongs and *Bunds* all over the Himalayan hills is done on a community basis. The *Ahars* (earthen Bandhis) and *Pynes* (water channel) of Bihar are community irrigation works. The Bandharas of Bombay are also owned and managed by private societies on a co-operative basis. All these private irrigation enterprises need lot of encouragement today.

---

*Water channel in a hilly area

3. Co-operative Irrigation

By far the best form of community irrigation is co-operative irrigation. Irrigation co-operative societies do not, at present, exist on any large scale in the country. But co-operative management of irrigation sources at least of a particular category, seems to be the only solution to many of our economic ills.

The cultivator to-day has started thinking in terms of consolidation of holdings. His land is dispersed and scattered and when he hears that this would get consolidated soon, he does not know which land he would actually own after consolidation. He is, therefore, reluctant to invest on permanent land improvements. The problem is acutely felt in Northern India where the land holdings are small due to over-population. A case in point is the well. It is the simplest source of private irrigation. The cultivator is not sure whether by sinking a well, the land around it would eventually belong to him. He has thus little interest in an irrigation well. The problem does not end there. Even if a person has got a small compact block of land under a well and if the well has capacity to irrigate larger area, he does not know what to do with the surplus water. If he is too shrewd and influential, he starts exploiting the smaller cultivators who purchase water from him at an enormous cost. Even for using a neighbour's well a cultivator has sometimes to pay large sums of money to the owner. In one of the Punjab districts a cultivator is required to pay as high as Rs. 16 per acre per season for using his neighbour's well, lifting of water being entirely the irrigator's responsibility.

Above are some of the complex problems encountered in rural areas. These come in the way of irrigation develop-

ment. The only effective solution seems to be the introduction of co-operative irrigation on a mass scale. If wells are sunk and owned on a co-operative basis, consolidation operations would cease to present problems.

In the recent past co-operative movement has received considerable emphasis. With the expansion of multi-purpose co-operative societies, it is hoped that co-operative irrigation also would become a common feature of these societies. A few multi-purpose societies in Uttar Pradesh are functioning as irrigation societies. In the Punjab also there are some purely irrigation societies which run and manage small tubewells. So also in Bombay some of the good wells or a group of wells with pumping installations are being managed on a co-operative basis. A remarkable example of co-operative irrigation is noticeable in the Godavari district of Andhra State. At one place there is a big lift irrigation scheme with three units of 40 to 50 horse power pumps installed on a perennial drain. It irrigates 1,000 acres of land. This land is owned by about 350 persons and 70 per cent of the land is held by persons who own less than five acres each. The capital invested jointly by the beneficiaries is Rs. 75,000. The cultivators pay an acreage charge of Rs. 25 to the society. With this contribution they not only meet the working expenses but also build up a depreciation fund for replacing the present plant after it has worn out. In the same district there is a tank co-operative society which is locally termed as "Water Bank". Here also a major portion of the irrigable land belongs to small cultivators all of whom are members of the society.

Development of irrigation through co-operation is a landmark in the history of private irrigation. Irrigation through Bandharas in the Nasik district of Bombay has

been maintained and managed by the ryots themselves as a co-operative enterprise. So also in the Himalayan hills of Himachal Pradesh *Kuhl* irrigation is practised on a co-operative basis, although the Societies managing them are perhaps not registered ones.

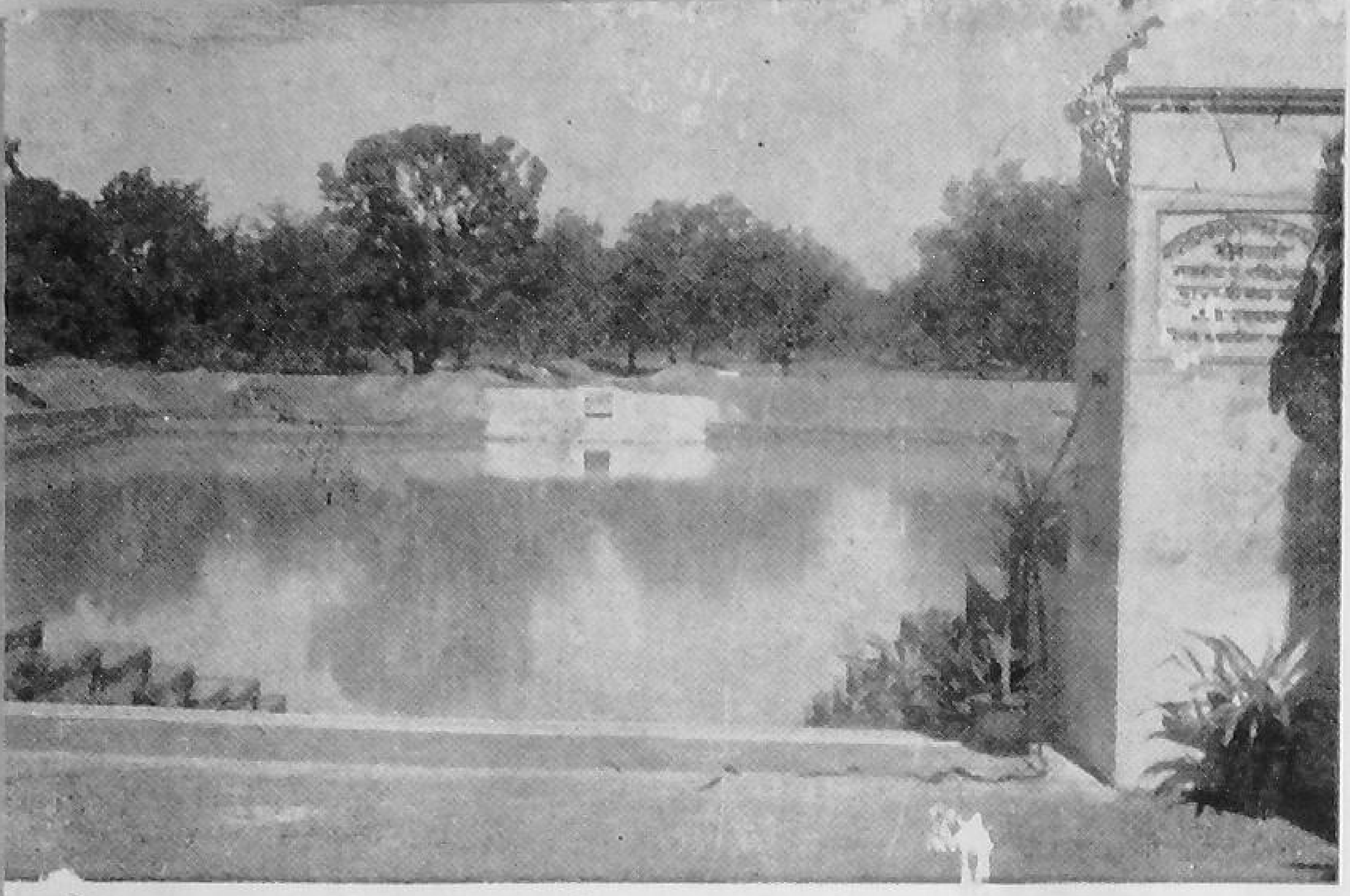
Past experience in the formation and management of irrigation co-operative societies has perhaps not been very happy. Societies were formed but subsequently failed for one reason or the other. The basic difficulty of personal ownership asserting itself and dominating all other interests is true of irrigation societies as it is true of other co-operative societies. For example, if two brothers jointly own a well, each likes to have a pump of his own to irrigate his land although a single pump would more than meet the requirements of both. Sometimes the interests clash. Local bickerings and feuds in villages aggravate the position and the society disintegrates. It may also happen that, in a society one well-to-do and shrewd person may dominate other shareholders who have small landholdings and are poor. The society, in course of time, deteriorates into oneman's show. He starts exploiting the poorer members who lose interest and eventually withdraw from the society. The society ultimately gets disbanded.

There is yet another factor which is responsible for the failure of irrigation societies. The members embarking on such a venture are often not aware of the technicalities of an irrigation installation. They are unable to manage it economically and water becomes costly. Running expenses mount up which the members find difficult to pay. The venture becomes commercially unattractive and the society fails.

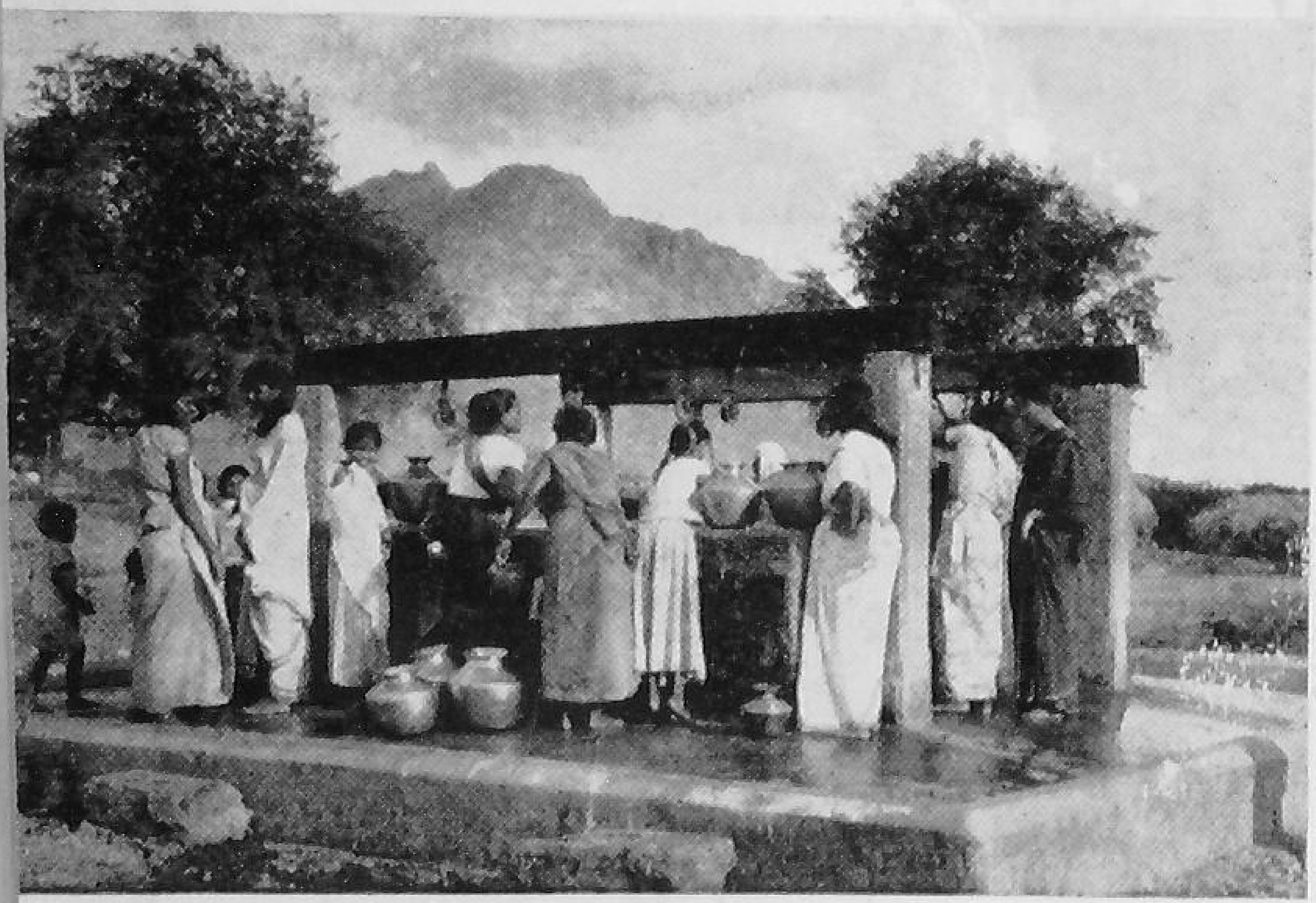
With the increase in education in the rural areas, it

An Aqueduct on timber

Water Channel from a Tube Well

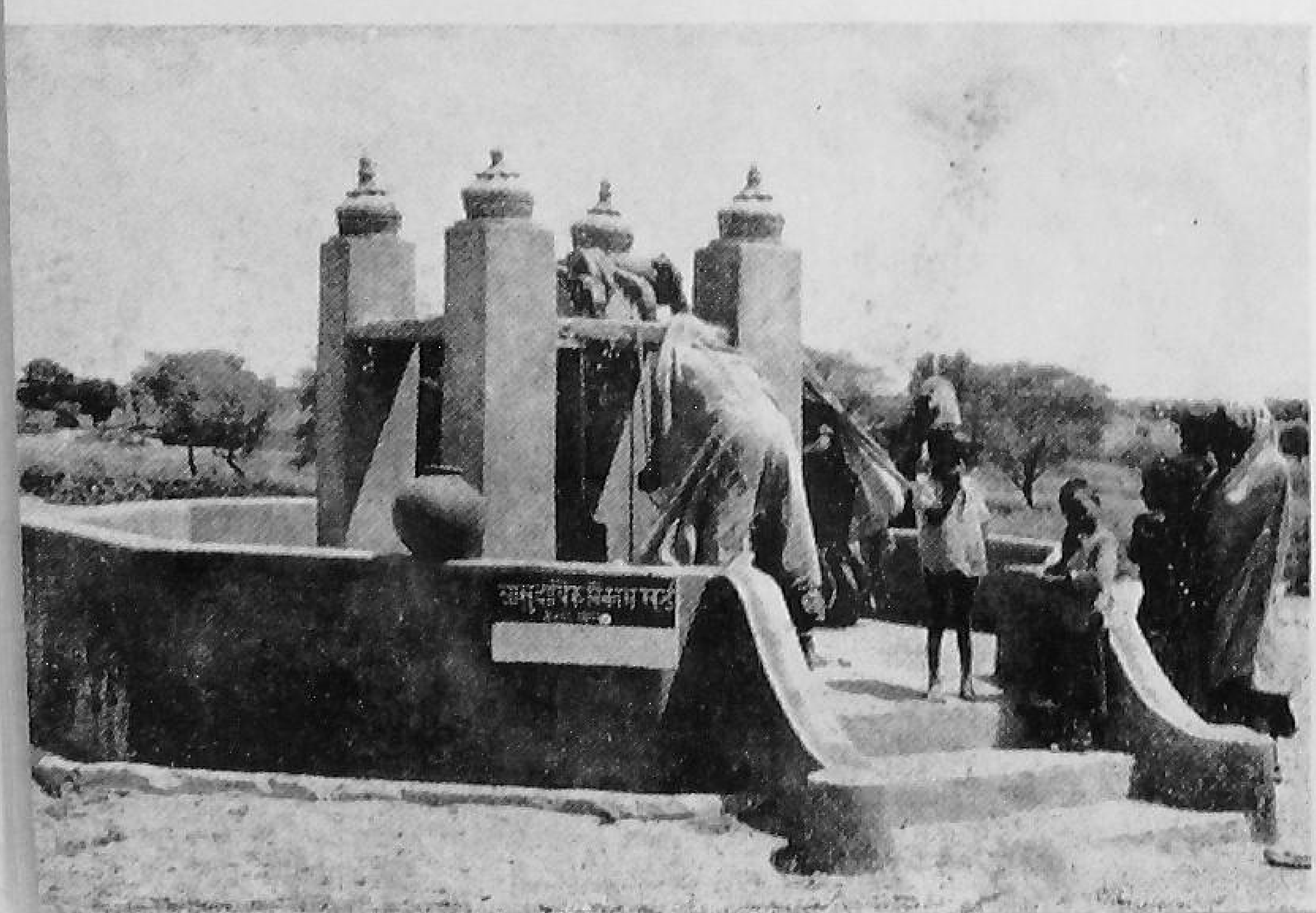


Tank in a P



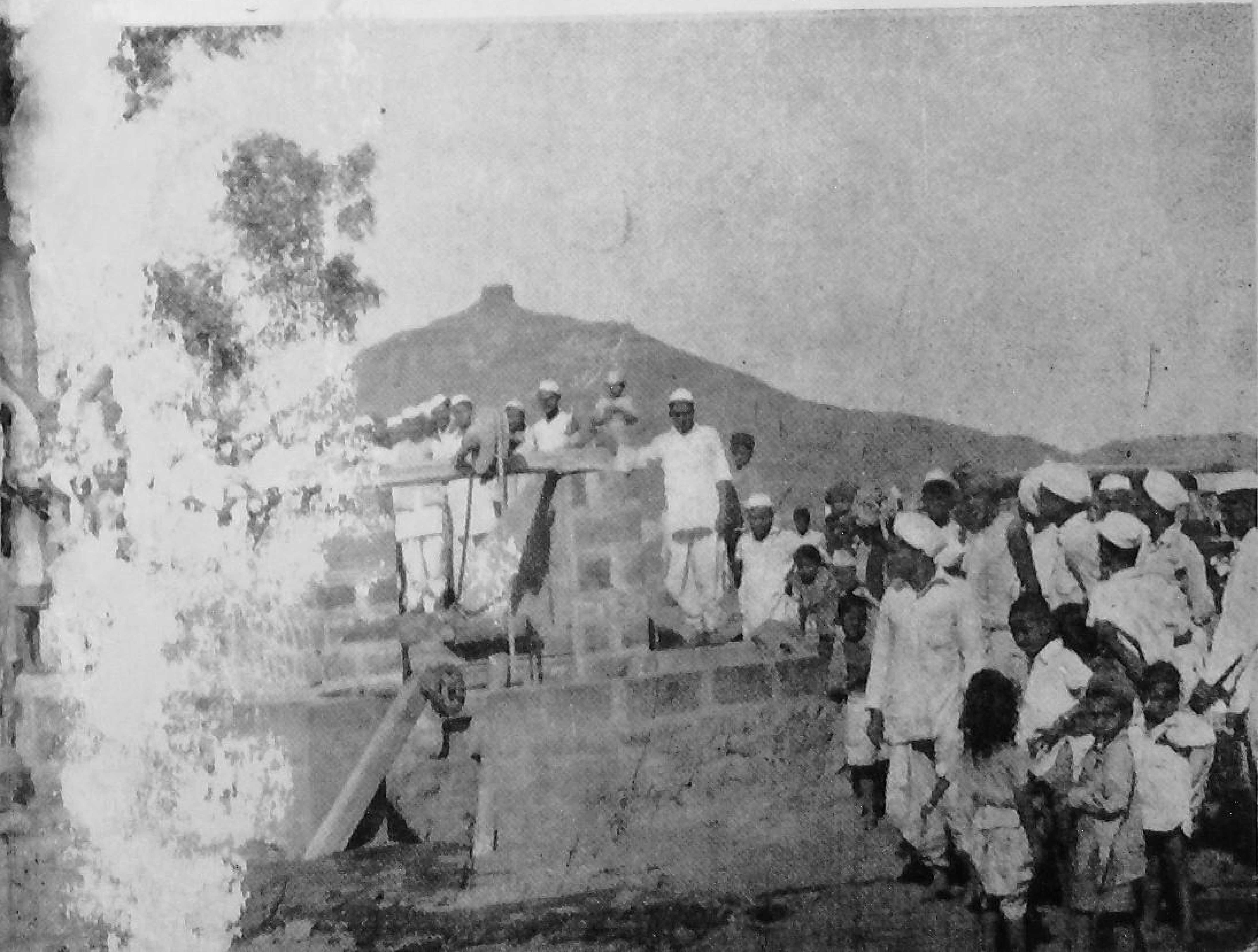
A Village Scen

A Well for the Harijans



ımprovɛd Well

A Cattle trough constructed
by the Villagers



Tank under construction

Women helping in the digging of a Well

is hoped that these difficulties would gradually disappear and irrigation through co-operation would gain ground. However, for quick development, irrigation co-operative societies, need some encouragement and inducement. Subsidies are available for private irrigation on a limited scale. These subsidies could be given to irrigation societies also. The Agriculture, Irrigation and Co-operative Departments could render valuable service by giving technical guidance to these societies in the initial stages. Also the linking of irrigation societies with other multipurpose co-operative activities connected with the transport, the marketing, etc., of agricultural produce would help to make an irrigation society a commercially attractive venture.

4. Maintenance and Management of Irrigation Works by the Community

One of the biggest problems facing the minor irrigation programme is the maintenance and management of minor irrigation works. With their ever increasing number it would physically be impossible for the Government to maintain and manage these works. In this sphere the community can play an important part. In quite a few States necessary legislation has been passed making it compulsory for the beneficiaries to maintain the works. It has, however, not had the desired effect, for it has somehow not been possible to enforce these laws. Works have gone into a state of disrepair necessitating Governmental intervention for their restoration. Ways and means have to be found out by which the community could be made responsible for the maintenance and the management of the small irrigation sources in an efficient manner.

Maintenance of minor irrigation works by local village

bodies is noticeable in several parts of the country. *Kuhl* irrigation in Himachal Pradesh and in the Kashmir valley has, till recently, been entirely privately managed. By common understanding every single cultivator under a *Kuhl* acquires right of irrigation. Terms for watering are fixed by mutual consent. Although there are occasional disputes about water, the manner in which the local rules are enforced without any interference from external authorities is remarkable.

Kashmir is one of the few states where even major canals have been maintained and managed by the community instead of by the Government. The most creditable performance could be noticed in the interior of this state in the Ladakh district. There are no local quarrels in water management. The irrigation channels are sometimes quite big and carry as much as 10 to 20 cusecs of water, irrigating an area of 1,000 to 2,000 acres. The cultivators maintain these channels in a very neat condition. For each village there is separate water channel. Two to three independent channels can be seen here flowing close to each other but taking off independently from the Indus river. It is not the practice to construct a single channel to replace these multiple channels, as it has been found much easier to maintain them by having independent channels for each village. The cultivators in the village have co-operative rights and are keenly interested in their maintenance. Even in the same village when the land under irrigation is large, more than one channel is excavated to serve the needs of the whole village.

Private management in some form or the other has been existing throughout the country. What is needed today is to strengthen the hands of the community and the local village institutions to enable them to maintain

It may also happen that water may be available at the irrigation source, but the land may not be prepared to receive it. Every year water may be collecting but the benefits of irrigation realised long after the completion of a work. Often it takes years to prepare the cultivator and make him receptive to irrigation water. With the limited resources available in our country it has become very necessary to explore how best we could obtain the optimum benefit of the conserved water in the shortest possible time. The technique of educating the cultivator and the community in accelerating and maximising the use of water, may be termed as "Irrigation Extension".

Irrigation Extension generally presents two sets of problems—engineering and agricultural. The remedial measures to prevent loss of water from the engineering point of view would be (*i*) to line the channel (*ii*) to have an elaborate system of water-courses and (*iii*) to regulate the rate of supply of water in a field according to its size. Lining of channels is generally costly, but where cheap lining materials like bricks, tiles, lime etc. are available this can be done with considerable advantage. This would be specially useful when the water is costly like the well and tubewell water. On account of rising costs of river valley projects it is now the common practice to line the major canals. Wherever production of cheap lining materials could be developed into a cottage industry, this would not only ensure fuller utilisation of irrigation water but would also stimulate local employment. Even crude linings specially in porous reaches would considerably prevent loss of water by seepage.

Then comes the question of internal distribution of water. Often there are no internal water-courses and field-

these works in an efficient manner rather than transfer their management to the Government. The latter would be a negative process and would defeat the objective of community management. As a logical conclusion of all our rural development programme, the village institutions in times to come, are sure to grow in stature and become dynamic bodies. In most states, it is visualised that small irrigation works which benefit a group of cultivators would be transferred to the village institutions for management. The revenues earned by the irrigation works would also go to these institutions which would be responsible for their maintenance and management. For this purpose it is very essential that these village institutions should have adequate technical staff to guide them in the efficient management of minor irrigation works.

5. Irrigation Extension

One of the most important tasks of the community is to see to proper utilisation of irrigation water. With the completion of several river valley projects large quantities of water are being collected and conserved waiting to be released to the thirsty land. Mere collection of water, however, does not solve our irrigation and agricultural problems. From the time the water leaves a canal outlet it has to pass through a hazardous journey. Often larger quantities of water are lost in the way and the land does not get the full benefit of conserved water. In other cases more water than is really necessary reaches the field and the excess is permanently lost. Yet in other cases too much water may have damaging effect on the crops and give negative results.

Like engineering, there are several problems pertaining to agriculture which, if attended to, would ensure optimum use of irrigation water. The most important is the actual water requirements of crops. For example, it is erroneously believed that continuous watering of paddy crop would yield the best results. Experiments conducted at the research stations have conclusively proved that in certain regions of the country a five-day watering in the week gives a better yield of paddy than a seven-day irrigation. In almost all regions the soil texture greatly influences the quantity of water required for the proper growth of a crop. For example, clay soils would need less water than porous ones. Then the type of crops proposed to be grown under an irrigation work determines, to a great extent, the demand for irrigation water. In northern India there is a large programme of tubewells. The demand for tubewell water could be greatly stimulated if regularly irrigated Rabi crops could be introduced under the tubewells. Sometimes combination of a cash crop like sugarcane with the other normal crops also becomes necessary to enable the cultivator to earn proper dividend on irrigation investment.

These techniques in water use have perhaps not received the emphasis they deserve. It is hoped that the community would take on itself the task of transmitting and spreading the message of "fuller and quicker use of water."

6. Reaching the Irrigation Technique to the Community

It has been remarked earlier that most of our major irrigation undertakings are State-owned. We rarely

to-field irrigation is resorted to. After one field is flooded, water enters the lower field. By this method it becomes difficult to control the quantity of water flowing into any particular field. When water is in excess of requirement, cultivators drain it out into the neighbouring *Nallas* causing great wastage. Cultivators have to be encouraged to construct their own water-course systems and thus economise the use of water. In selected reaches the Extension workers could take up this work on a community basis. Within the existing irrigation sources located in the Community Development and National Extension Service blocks where water may be used in a wasteful manner either for want of a distributary system or because of defective watering practices, blocks of 50 to 100 acres of land could be selected for intensive irrigational activity. An elaborate system of watercourses could be constructed in these blocks with people's participation. This would result in the saving of a substantial quantity of water and it would be possible to bring larger areas under irrigation. Once cultivators resort to wasteful methods, it becomes difficult to correct them later on.

Loss of water quite often occurs in the field itself. If water goes beyond the root zone of the crop it is permanently lost. When the soil is porous and the rate of flow of water slow, water may be lost by its percolating beyond the root zone. This points to the need of regulating the rate of flow so as to correspond with the size of the field. Thus, if the rate of flow is fast and the size of the field is such as to fill it quickly, water will get little time to percolate beyond the root zone. If, therefore, the correct relationship between the rate of flow of water and the size of the field is maintained, it would be possible to irrigate larger areas with the same quantity of water.

Service movement could play an effective role in reaching the irrigation technique to the village level. The objective should be that just as villagers construct rural houses, and rural roads, they should also be able to construct minor tanks, small diversion weirs and even major embankments.

7. Irrigation Benefits and the Community

Irrigation works benefit not only the irrigators but the community as a whole. We often underestimate these benefits by judging the utility of irrigation works from the direct revenue return alone. The indirect benefits of irrigation to the community are so great that an irrigation service could be appropriately called a community work.

The immediate impact of irrigation is, no doubt, on food production, but an increase in the food production brings in its train, immense prosperity to others also though they may not be directly benefiting from the irrigation water. Increased food production offers increased employment. The handling of grain, transporting and marketing—all these provide employment to the rural population who may otherwise have to flock to distant places in search of work. Often increased irrigation facilities stimulate local industries. For example, in certain areas where Persian Wheels were introduced for the first time, a number of shops manufacturing metallic buckets sprang up in the course of a very short time. If the community becomes conscious of these indirect irrigation benefits, their enthusiasm for irrigation works would greatly increase and they would become active participants in the irrigation programme even if they do not stand to profit by it directly.

hear of irrigation companies or private irrigation managements. Nor do we come across instances of people taking up, on their own, construction and management of hydraulic structures like storage tanks and weirs. The community could greatly benefit if broad techniques of irrigation engineering could be reached to the village level. All around we see houses in rural areas, village roads, culverts and small bridges being constructed by the people themselves without much assistance from the technicians. If the cultivators who mainly constitute the community could be given simple training in the special features of hydraulic structures, they would be encouraged to initiate and take up such works themselves. Instances of the accomplishment of such works by the people in the past are not lacking. In central and southern India for instance exists a beautiful system of minor irrigation tanks. When we enquire, who built them the cultivators tell us that their forefathers joined hands and built them. They even surveyed the areas on horseback. Their trained eyes could mark out the water shed, bund alignment and the sites for the waste weir and canal outlet. Similarly in the water channels of the Himalayan Hills a number of irrigation crossings have been built by the people themselves. Sometimes their aqueduct consists of wooden beams, resting on timber abutments. Over the beams is laid earth mixed with small grass. The irrigation channel is carried across this, its embankments being suitably protected by boulders. These irrigation crossings, carrying the channel water, without even a drop leaking out into the drainages they cross, are a most remarkable sight, and could easily be classed as feats of rural engineering.

The Community Project and the National Extension

THE PUBLICATIONS DIVISION
Ministry of Information and Broadcasting
Government of India